REMARKS

Claims 1-7 are pending and under consideration in the above-identified application.

In the Office Action, Claims 1-7 were rejected.

In this Amendment, Claims 1, 3 -5 and 7 are amended, Claims 2 and 6 are cancelled. No new matter has been introduced as a result of this Amendment

Accordingly, Claims 1, 3 – 5 and 7 are now at issue.

I.   **35 U.S.C. § 102(b)/103(b) Rejection of Claims**

Claims 1, 2 and 4- 6 were rejected under 35 U.S.C. § 102(b)/103(b) as being anticipated by Fukai et al. ("Fukai") (JP 2001-122628).

Claim 1 is directed to a cathode material. The cathode material comprises a complex oxide including lithium (Li), manganese (Mn), chromium (Cr) and at least one kind selected from the group consisting of titanium (Ti), magnesium (Mg) and aluminum (Al). A composition ratio of lithium to the total of manganese, chromium, titanium, magnesium and aluminum in the complex oxide is larger than 1 in molar ratio.

Amended Claim 1, which incorporates the substantive limitations of Claim 2, recites that "the complex oxide is represented by a chemical formula $Li_a Mn_b Cr_c Al_{1-b-c} O_d$ (where the values of a, b, c and d are within a range of $1.0 < a < 1.6$, $0.5 < b + c < 1$ and $1.8 < d < 2.5$)."

That is, the composition b+c of the total of manganese and chromium is required to be larger than 0.5 and less than 1. Further, a critical point of this range for the composition b+c is that when b+c is lower than 0.5, then the redox center, a function of the chromium, is decreased, thereby the charge-discharge capacity declines.

In contrast, Fukai teaches a multi-component oxide expressed by the general formula:

$Li_x Mn_{1-y-z} M_y N_z O_a$
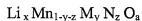
where M denotes at least one element selected from the group consisting of Cr and Al, N denotes at least one element selected from the group including Mg and Ti and the values of x, y, z, and a are within a range of $0.8 < x < 1.2$, $0 < y < 0.2$, $0 \leq z \leq 0.2$ and $1.8 < a < 2.3$.

As Fukai teaches that M may be a mixture of Cr and Al when z = 0, then the composition of the total of manganese and chromium adds up to $(1 - y) + y$ which is equal 1. Therefore, Fukai teaches that the composition of the total of manganese and chromium is equal to 1, which is distinct from and always greater than the claimed b+c values which are selected to be greater than 0.5 and less than 1.

Moreover, Fukai fails to teach or suggest the criticality of the impact of values of the total composition of the magnesium and of the chromium that are less than 0.5 on the charge-discharge capacity properties. That is, Fukai fails to teach or suggest the critical correlation between the claimed range of the total composition of the magnesium and of the chromium and the charge-discharge capacity properties.

As such, since the claimed range of the composition b+c is critical and not obvious to one of ordinary skills in the art, then Claim 1 is patentable over Fukai.

Claim 5 has been amended in a similar fashion as Claim 1, and is thus also patentable over Fukai.

Claim 4 is directed to a method of manufacturing a cathode material, the cathode material comprising a complex oxide including lithium (Li), manganese (Mn), chromium (Cr) and at least one kind selected from the group consisting of titanium (Ti), magnesium (Mg) and aluminum (Al). The method comprises the step of mixing materials with ethanol as a dispersion medium to synthesize the complex oxide.

The examiner states that Fukai teaches obtaining the oxide by mixing materials with water as a dispersion medium. However, Fukai fails to teach or suggest obtaining the oxide by mixing materials with ethanol.

Thus, Claim 4 is patentable over Fukai.

Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

II.   35 U.S.C. § 103 Obviousness Rejection of Claims

Claims 3 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukai.

Claim 3 is directed to a cathode material, and has been amended to incorporating Claim 1 into Claim 3.

Amended Claim 3 recites that "the complex oxide is represented by a chemical formula $Li_{1+e} (Mn_f Cr_g M_{1-f-g})_{1-e} O_h$ (where M is at least one kind of element selected from the group consisting of titanium, magnesium and aluminum, and the values of e, f, g and h are within a range of $0 < e < 0.4$, $0.2 < f < 0.5$, $0.3 < g < 1$, $f + g < 1$ and $1.8 < h < 2.5$)."

That is, the composition f+g of the total of manganese and chromium is specified to be larger than less than 1, that the composition f of manganese satisfies $0.2 < f < 0.5$, and that the composition f of chromium satisfies $0.3 < g < 1$.

Further, a critical point of the range for the composition of the chromium g is that g is specified to be larger than 0.3, because when the compositions g is small, the redox center is decreased and the charge-discharge capacity declines.

Moreover, another critical point is that the composition f of magnesium is specified to be larger than 0.2 and smaller than 0.5, because when the composition f is too small, the layer structure cannot be maintained, on the other hand, when the composition f is too large, the amount of chromium as a redox center is decreased, thereby the charge-discharge capacity declines.

In contrast, Fukai teaches a multi-component oxide expressed by the general formula:

$Li_x Mn_{1-y-z} M_y N_z O_a$
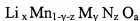
where M denotes at least one element selected from the group consisting of Cr and Al, N denotes at least one element selected from the group including Mg and Ti and the values of x, y, z, and a are within a range of $0.8 < x < 1.2$, $0 < y < 0.2$, $0 \leq z \leq 0.2$ and $1.8 < a < 2.3$.

As Fukai teaches that M may be a mixture of Cr and Al when z = 0, then the composition y of the chromium satisfies $0 < y < 0.2$. Therefore, since the disclosed upper value of y is 0.2 instead of being between 0.3 and 1, then Fukai teaches away from the claimed range of the chromium composition.

Moreover, as the Examiner stated Fukai teaches that y and z can be at most 0.2, thus the compositions of manganese $(1 - y - z)$ can not be less than 0.6. As such, Fukai teaches away

from the required manganese values which are greater than 0.2 and smaller than 0.5, so as to avoid as stated above higher values of manganese which leads to a decrease in the redox center and thereby a decline in the charge-discharge capacity.

Thus, for at least the above discussed reasons Claim 3 is patentable over Fukai.

Claim 7 has been amended in a similar fashion as Claim 3, and is thus also patentable over Fukai.

Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

III. Conclusion

In view of the above amendments and remarks, Applicant submits that Claims 1, 3 – 5 and 7 are clearly allowable over the cited prior art, and respectfully requests early and favorable notification to that effect.

Respectfully submitted,

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